

# A NEW SPECIES OF *BONELLIA* FROM PORT JACKSON.

BY

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(Plates xv.-xvi.)

The earliest record of *Bonellia* in the South Pacific is that by Professor Haswell who, in 1885, reported what he believed to be *B. viridis* from Neutral Bay, Port Jackson; noting at the same time that instead of inhabiting narrow fissures in rocks it was found under small stones just above the limit of low water. Anatomically his specimens were said to be identical with *B. viridis*, except with regard to the reproductive organs which, however, were immature.

Whitelegge<sup>1</sup> reported *B. viridis* from another locality in Port Jackson, viz., Mosman Bay, obtaining his specimen under a stone during a low tide.

Shipley<sup>2</sup> recorded the species from the Loyalty Islands, and from the D'Entrecasteaux Group.

In considering the remarkable known distribution of this species, viz., Mediterranean, North Sea and South Pacific, Sluiter<sup>3</sup> expressed the opinion that a detailed examination of specimens from the last named locality would show them to be distinct from the European form. In the case of the Sydney material we have found this view to be justified. The specimens are not *B. viridis*, but closely resemble *B. minor*. Full descriptions of the latter are not at our disposal, but even from the meagre accounts that we have, it is clear that the two species are not identical. If they had proved to be so, then, taking into account the known distribution of *B. minor* (viz., the Mediterranean) the occurrence would have been just as remarkable as if they had proved to be *B. viridis*. It should be stated, however, that Ikeda<sup>4</sup> has reported *B. minor* from Japan, noting at the same time certain differences in the anal vesicles, which again differ from those of the Australian forms here described.

We desire to express our indebtedness to the Director of the Australian Museum, Sydney, for allowing us to re-examine Mr. Whitelegge's specimen; and to Professors W. A. Haswell, F.R.S., and S. J. Johnston of the Sydney University for the opportunity to use Professor Haswell's original material.

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<sup>1</sup> Whitelegge—Proc. Roy. Soc. N.S.Wales, xxiii., 1889, pp. 163-323.

<sup>2</sup> Shipley in Willey's Zoolog. Results, iii., 1899, pp. 335-353.

<sup>3</sup> Sluiter—Siboga Expeditie, Monogr. 25 (Gephyrea), 1902.

<sup>4</sup> Ikeda—Journ. Coll. Sci. Univ. Tokyo, xx., 1904, pp. 72-73.

*BONELLIA HASWELLI* n. sp.

The following description is based on an examination of the preserved specimens, one collected by Whitelegge<sup>5</sup> and the other by Professor Haswell<sup>6</sup>. They were preserved in alcohol, and were, of course, decolourised. The colour of the living worms was stated to be green.

The animal has a typical *Bonellia* shape (Pl. xv., fig. 1), the sac-like body measuring over two inches in length and 3·4 inches in greatest breadth; while the contracted proboscis measures about four inches, and each arm of the bifurcation about 1½ inches. The ventral proboscis-groove is very distinct.

The skin is marked by transverse ridges consisting of rows of rather small papillæ, just visible to the naked eye. This marking occurs uniformly over the whole body, but not on the proboscis.

In section (Pl. xvi., Fig. 5), the wall is seen to consist of an outer epidermis, below which is a dermis, succeeded by three muscle layers. The epidermis consists of a layer of elongated, irregularly compressed cells, with darkly staining nuclei, among which lie a few scattered, heavily staining cells, probably of the nature of mucin-secreting gland cells. These do not extend into the dermis, as has been described in other forms (e.g., *Pseudobonellia*; *B. punicea*). The dermis is strongly developed, especially below the papillæ, the whole of the internal mass of the latter being composed of it, no part of the muscle layers entering into its formation. The dermis may be divided into two very distinct parts, an outer somewhat hyaline, and an inner fibrous portion. The outer layer consists of a mass of loose connective tissue which is well developed at the sides of the papillæ and also between them, though it may here be displaced by the fibrous layer. The dorsal part and the "core" of the papilla, however, consist of the fibrous layer. The fibres have a longitudinal direction; above, they form a dense layer beneath the papillary epidermis, and communicate below with the inner muscle layer, serving possibly as retractors of the papillæ and thereby assisting in locomotion. The longitudinal muscle layer is not broken up into distinct bands.

There are two setæ, measuring at least 11 mm. in length.

The alimentary canal is typical of *Bonellia*, but is somewhat more strongly coiled. The pharynx is wide, the œsophagus narrow and thick-walled, while the intestine is wide and very thin walled, narrowing off towards the anus. Numerous strong mesenteric strands pass from the body wall to the intestine. In this species a definite siphon is present. It originates as a very narrow tube on the dorsal surface of the pharynx and widens somewhat posteriorly. It has no posterior communication with the intestine, but ends blindly in a curious lobulated structure. Possibly this is the degenerated remains of a complex funnel similar to

<sup>5</sup> Whitelegge—*Ibid.*

<sup>6</sup> Haswell—Proc. Linn. Soc., N.S.Wales, x., 1885, pp. 331-2.

that described by us for *Pseudobonellia*<sup>7</sup>. The siphon is nearly 1·2 inches in length, and is surrounded by peritoneum which connects it posteriorly with the intestine. The posterior end of the siphon is about 1·3 inches from the point where the mesentery attaches it to the gut-wall (Pl. xv., fig. 2; Pl. xvi., fig. 6).

Into the cloaca open the two anal vesicles. They are less elongate than in *B. viridis*. Into each open about fifteen tubes, some quite short, others much longer (Pl. xv., fig. 4; Pl. xvi., fig. 7). These tubes give off smaller or larger numbers, at times very large numbers, of secondary nephridial tubes, each ending in a narrow neck which bears a circular disc with the nephrostomial opening in its centre. The disc is composed of a ring of compressed elongated cells, with strongly staining nuclei, and fringed with a ring of cilia (Pl. xvi., fig. 8). Mesenteric strands pass from the body wall to the anal vesicles and to the larger tubes.

The vascular system is fairly typical. There is a narrow ventral blood vessel bifurcating below the pharynx. It is joined by a very large intestinal vessel which (Pl. xv., fig. 2) is seen as a definite structure adjacent to the intestinal walls, especially posteriorly.

The ovary resembles that of *B. viridis*. In one specimen it was only slightly developed; in the other it was much larger, lying midventrally along almost the whole of the length of the animal. The ova are large and round, with a prominent nucleus and a darkly staining nucleolus; the protoplasm is strongly vacuolated. The largest ovarian eggs measured 0·04 mm. in diameter.

There is a single uterus situated on the left side of the body. When empty it is a rather transparent organ, about 1·2 inches long. Situated at about one quarter of its length from the free end is the "uterine funnel." This is a peculiar little organ, less than 1 mm. long, consisting of a short hollow stalk, which widens out asymmetrically into a broad leaf-shaped opening, with a strongly crenated rim fringed with cilia. The internal opening is on a level with the walls of the uterus, i.e., there is no valvular mechanism such as occurs in *Pseudobonellia*. The end of the empty uterus is contracted into a blunt point showing strong longitudinal ridges, and probably admits of a fair amount of distension during sexual activity.

Males were sought for in the coelome, pharynx and uterms, but were not detected. It should be noted, however, that neither specimen was sexually mature.

We have pleasure in associating with this species the name of Professor W. A. Haswell, who has done so much to advance our knowledge of Eastern Australian Zoology.

The type specimen of *B. haswelli* collected by Whitelegge, is in the collection of the Australian Museum, Sydney, reg. no. G. 11,220.

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<sup>7</sup> Johnson and Tiegs—Proc. Linn. Soc. N.S.Wales, xlv., 1919, pp. 213-230.

Mr. C. Hedley many years ago collected a large specimen of a *Boiellia* at Masthead Island<sup>8</sup> and handed it to Professor Haswell who showed it to the senior author. It appeared to possess external characters and size similar to those of *B. haswelli*. Unfortunately the worm has been mislaid. It is quite likely that the Sydney specimens represent stray members of this species carried down the coast from the Queensland Barrier Reef by the warm southerly current which is usually deflected long before it reaches Sydney, but which sometimes reaches that latitude, bringing with it various invaders in the form of tropical and subtropical animals and plants, most of which fail to obtain a permanent foothold<sup>9</sup>. Probably the Sydney specimens travelled as trochophores. Their scarcity would account for the apparent absence of males in both cases, especially as it is stated that larva require to come into contact with the female in order to develop into males, otherwise they become females.

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<sup>8</sup> Hedley—Proc. Linn. Soc., N.S.Wales, xxxi., 1906, p. 462.

<sup>9</sup> Hedley—Proc. Roy. Soc. N.S.Wales, xlix., 1915, p. 27.